The Learning Revolution

The Web and other collaborative technologies are helping companies redefine corporate learning-and do a better job of training employees

By Justin Hibbard

Question: What do President Clinton, the head of research at General Motors Corp., and IS managers at Eli Lilly & Co. have in common?

Answer: They're all boosters of learning and training.

Sure, the need for training has always been right up there with honesty, goodness, and Mom's apple pie. What's new is that a small yet influential group of companies is rethinking the way they train employees. These pioneers are moving beyond one-way, formal training in which the computer teaches and the student absorbs. Instead, these companies are using IT--mostly available tools such as computer-based training and the Web--to unleash the power of collaborative training.

"Learning used to just mean training," says Tom Solomon, senior manager of professional and organizational development at consulting firm Ernst & Young in New York. "We're broadening the definition to mean certain communications, collaboration between teacher and student, and performance support."

A group of vendors has convened under the heading "learning technology" to offer Web-based training servers, authoring tools, courseware, training-management software, and training services. Among this group are some old names--including Gartner Group Inc. and Learning Tree International--as well as some new ones, including Centra Software, DataBeam, and Pathlore Software.

Support for new learning initiatives is coming from top management in a variety of industries. Educating the work force tops the agenda of many business and government leaders, and the reason why is clear: In a knowledge-based economy, building intellects is as critical as building factories. Increasingly, the tool for building intellects is IT. "Almost all the executives at major companies are mentioning people, knowledge, and learning," says Jim Miller, executive director of business and marketing at Raytheon Systems Co.'s training unit in Arlington, Texas. "They're indicating that human performance is a corporate benefit they need to maintain."

Among those top executives is Ernest Deavenport, CEO of Eastman Chemical Co., a $4 billion manufacturer in Kingsport, Tenn. In a speech earlier this year, Deavenport emphasized that his industry "must invest in our work force by enhancing the knowledge and skills of our employees." Jerry Jasinowski, president and CEO of the National Association of Manufacturers in Washington, made a similar point during a recent speech, saying, "Training is the key to American competitiveness and worker success in the new global economy."

Even President Clinton has jumped aboard. He issued a January memorandum that requested the heads of federal agencies to draw up plans for using the new learning technologies. "Federal agency training programs should be model users of new technologies," the president wrote.

Training To The Rescue

Much of corporate America's renewed interest in learning stems from an abundance of unfilled positions and a lack of skilled workers--a problem with which IT managers are all too familiar. A much-quoted study released in January by the Information Technology Association of America in Arlington, Va., found 346,000 unfilled IT positions in U.S. companies. What wasn't as widely quoted: The ITAA identified education as a key to solving the crisis, and it found that universities aren't graduating enough IT workers to fill all the job vacancies.

As a result, companies in high-technology fields spend more on training and use learning technologies more than companies in any other industry group. A January study by the American Society for Training and Development in Alexandria, Va., found that high-tech companies--in industries including computer systems, communications, biological and physical research, and drugs--spend an average of $911 per employee per year on training, more than any other sector.

Given the emphasis high-tech industries place on training, it's ironic that few learning-technology projects are being led by CIOs. More typically, the project leaders work for corporate departments that focus on training, knowledge management, and business reengineering. Still, these same people often work with their organizations' IS departments to specify, install, and implement these learning systems.

But IT isn't the only field that's hurting. Other fields are suffering from a more general skills gap that makes it hard to fill positions, train new hires, and keep veteran employees up to speed. The skills gap is one result of the unprecedented rate of change in technologies and business processes that affects all workers. "With technology changing so much from one day to the next, it affects all of us, not only in the IT area," says Linda DeBerry, managing director of human resource development at Federal Express Corp. in Memphis, Tenn.

Compounding the problem: Compared with the pace of technological change, training is slow. "We have the ability to change product and process overnight, but we don't have a parallel ability to disseminate knowledge," says Elliott Masie, president of the Masie Center, a technology and learning think tank in Saratoga Springs, N.Y.

Small, For Now

Today, the scope of learning technology's use is best characterized as small, but growing. Only about one in five companies makes training available through computers, according to a 1997 study of 202 large U.S. corporations conducted by the University of Southern California. But those companies expect to double the amount of computer-

based training they offer by the year 2000. "One of the big shifts you're seeing is from classroom-based education to computer-based education," says Richard Huseman, a researcher at the university's Corporate Knowledge Center, which conducted the study.

For many companies, the arrival of Internet- and intranet-based training presents an opportunity to bring knowledge dissemination up to 21st-century speed. In a survey of 700 training professionals conducted in February by the Masie Center, 80% of respondents said they expect demand for Web-based training to increase in their organizations this year. By contrast, 75% said they expect more demand for CD-ROM-based training, and more than 60% said they expect the same for classroom-based training.

Web-based training provides instant distribution that isn't possible with media such as CD-ROMs. More important, Web technology lets workers learn through informal interaction with peers and instructors. In fact, new research suggests that informal learning is the most valuable form of learning that occurs in companies. In a study released in January, the Center for Work force Development, a nonprofit research organization in Newton, Mass., found that informal learning fulfills as much as 70% of the learning needs in organizations such as Boeing, Motorola, and Siemens.

The group also found that the most effective learning happens when training is embedded in work processes. Software developers have been building applications that do this for about seven years. At the core of these electronic performance support systems (EPSS) are tools that workers need to do their jobs, such as a suite of accounting applications. Also built into the tools are courseware modules, which let users get on-the-spot training for nearly any job-related task. The systems may also offer reference tools that let users look up obscure rules or procedures.

EPSS are less likely to run as standalone PC applications and more likely to run as collaborative intranet applications. One example is the Scientific Performance Improvement Network (Spin), now in pilot testing at Eli Lilly & Co., the $8.5 billion pharmaceuticals maker in Indianapolis. Spin, designed for Eli Lilly's research scientists, is a custom application that runs on Lotus Development's Domino servers and is accessible through the Lotus Notes client or Web browsers. It combines threaded discussions, a directory of subject-matter experts, links to databases, and online courses.

Spin's courses are designed not only to impart existing knowledge, but also to create new knowledge through interaction. "We're presenting Spin as how we do knowledge management," says Andy McGuire, manager of employee development at Eli Lilly.

As part of each Spin course, scientists propose a project in which they apply the concepts they learn, then submit the proposal to a Notes database. After that, a mentor with access privileges can view the proposal and add comments. Also, each course is linked to a discussion database in which scientists can compare notes about what

they're learning.

Spin's collaborative features are integrated with more-traditional EPSS features. A reference area lets scientists search an index of Web sites and proprietary documents stored in Eli Lilly's databases. Each document identifies its author and the author's expertise and contact information. A tools area offers links to commonly used Web sites and applications. Users can customize the Spin interface with links to tools they use regularly, and they can make their personal links available to others through a common interface.

Like Eli Lilly, General Motors is testing an EPSS application that can impart information through formal courses as well as capture new knowledge discovered while employees work. GM's application is designed for mechanics who need to learn while they work. The automaker is developing its application to run on the Mentis, a notebook-sized, wearable PC from Interactive Solutions Inc. in Sarasota, Fla. Technicians wear the Mentis on their belts and control the voice-driven system by speaking into microphones. They view the graphical interface on a flat-panel display mounted nearby.

Short But Sweet

GM intentionally designed the user interface for its EPSS application without long menus or search engines. Instead, the system simply presents the appropriate materials based on the user's expertise and the difficulty of the problem. Expert users get fast access to technical details, while novices get on-demand training for specific tasks.

When technicians finish a repair, they describe the procedure aloud, noting any undocumented problems or solutions they discovered. Their words are converted to text files. Eventually, GM plans to use its dealer intranet to send technicians' comments back to GM headquarters. Technicians at GM will review the reports and decide whether to alter a service procedure or add a mechanic's discovery to the training materials.

Jim Roach, program manager at GM's service technology group, says the company's EPSS application has the potential to change not only the way technicians learn, but also the way they work. Technicians will be able to work on a wider variety of vehicles because the support they need is built into the training equipment. "We get smarter workers with more transferable work skills throughout the work force," Roach says. "It's a step toward transferring workers from one place to another and trading their knowledge."

Other companies are examining ways in which workers can trade knowledge without going anywhere. Ernst & Young is testing a product called SceneServer, from Digital Knowledge Assets in Chicago, that lets geographically dispersed users collaborate through a shared intranet site. The company wants to use the product to continue the collaboration that takes place in courses it currently offers via videoconferencing.

Ernst & Young doesn't plan to deliver formal courses through SceneServer. In fact, Solomon says one-way delivery of courses can often be ineffective. "Learning has always been about push," he says. "But in an era of constant change, we can't push all the right answers to you."

That's why the informal SceneServer courses won't use traditional instructors. "We're envisioning, instead of an instructor, a learning community consultant who sits back and sees what people are asking for and puts them in touch with the right people and resources," Solomon explains.

SceneServer lets users submit documents, E-mail messages, Web sites, and other resources to a shared object repository. Users can search the repository and add comments or ratings to objects. They can view lists of available information resources filtered according to their personal preferences or others' preferences. They can also view a list of other users with similar interests.

Other intranet-based training products currently available combine collaboration with traditional course delivery. Lotus's LearningSpace 2.5 provides development tools for creating formal courses that run on a Lotus Domino server. It also offers MediaCenter, a repository from which users can access training CDs, Web sites, and multimedia content such as streaming video. In addition, LearningSpace 2.5 features CourseRoom, an environment in which teams can collaborate on assign- ments and participate in discussions.

But not everyone is sold on the benefits of collaborative training. "Learning is an individual experience," argues Roger Schank, director of the Institute for Learning Sciences at Northwestern University in Evanston, Ill. He says that while Internet hype has led many to believe that all applications are more effective when networked, effective learning happens instead when an application presents personalized responses to a single user's input.

Not surprisingly, that's exactly the type of PC-based training applications Schank and his colleagues have developed. One application they built for Target Stores Inc., the $15 billion retail chain in Minneapolis, presents video simulations of situations a Target employee might encounter when working the complaint desk. The employee being trained sees a video of a complaining customer, responds, and then has his or her choice of words evaluated by the system.

Still, many expect the future for collaborative training will be bright. "When people interact with each other, they wind up with better comparisons and judgments," says Gloria Gery, an independent consultant in Tolland, Mass., and the author of an influential book on training systems. Collaborative learning technologies also present an opportunity to generate and capture new knowledge, rather than disseminate existing knowledge, Gery adds.

Another hot area is reusable content objects. The content of most of today's courseware can't easily be moved from one course to another. Also, most courseware is compatible with only one vendor's server software. But as more companies move to Web-based training, demand is growing for courses made of objects that can be combined and recombined, and for multiplatform compatibility.

In A Hurry

One advocate of the reusable approach is the Department of Defense, in part because it offers 20,000 courses to 1 million employees each year. "It's a significant cost to run the infrastructure," says Don Johnson, a senior program analyst at the department. To help cut that cost, the department recently helped launch the Advanced Distributed Learning initiative. One of its goals is to support the development of a standard object specification that can act as a guideline for developers of future systems. Apple Computer, IBM, Microsoft, and Sun Microsystems are among the vendors working with Educom, a Washington nonprofit group devoted to technology and education, to develop the specification.

Some companies can't wait for the government. Buckman Laboratories International Inc., a $280 million chemicals company in Memphis, Tenn., uses LearningSpace 2.5 on its intranet to educate more than 130 employees worldwide about specialty chemicals and company procedures. Mark Koskiniemi, VP of human resources at Buckman, says the integration of formal training and collaboration fits Buckman's culture, which encourages employees to share knowledge. "We are known for our knowledge-sharing activities, and the ability to have the CourseRoom in LearningSpace is a real plus," he says.

Buckman employees are familiar with the kind of learning that can happen through electronic collaboration. One of its employees in Indonesia once had an opportunity to bid on an account at a paper mill, but he lacked experience in the pulp and paper industry. The employee posted a message in a discussion forum on Buckman's intranet, and within 48 hours he had gathered responses and sample proposals from co-workers all over the world. Using that knowledge, the employee then closed a $6 million sale--without any formal training.

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